

Application Serial No.: 10/644,541

Amdt. dated 1/31/05

Reply to Office Action of November 16, 2004

In response to the Office Action mailed 11-16-2004, please consider the following remarks;

REMARKS/ARGUMENTS

The Invention

The claimed invention relates to a self regulating rotor with a set of cups or vanes that are pivotally attached about a central axis. The cups form a closed three dimensional shape when closed.

The rotor design allows the cups to totally close without the need of a gap or space between them. This design allows the cups to take a multitude of three dimensional shapes.

There is no space or gap between the cups, and the shape of the cups do not have to be modified in order for the cups to slide past one another. The totally closed three dimensional shape prevents the cups from catching wind energy or weather elements, such as ice and snow.

When rotated into an open orientation, the two cups form an S-shaped rotor when viewed as a horizontal cross-section. In the totally open orientation, the cup overlap is not limited to an overlap of 50%. The design allows for the totally open cups to have specific overlaps less than 50%. Overlaps of less than 50% have been shown to be the most efficient and affective overlaps for S-shaped rotors.

Each cup is attached to a cup shaft such that the cups can pivot or rotate from a closed shape to an open S-shape. The cup shafts do not function as a part of the supporting structure, e.g., they are not needed to hold the top and lower sections of the rotor together. Therefore, the cup shafts may be placed in locations other than where support would be needed.

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Instead, the cup shafts can be placed where they and the attached cups can best capture the energy in the wind. This flexibility also allows for cup shafts of greater lengths that can support cups of greater height.

The claimed rotors have end plates through which cup shafts are pivotally supported, and a central shaft to which end plates are attached. The bottom end plate does not support the total rotor structure. The total rotor's structure is carried on a central shaft to which all end plates are connected. This design of a central shaft and attached end plates allows rotor designs not possible with rotors using their lower plate to totally support the rotor's structure. A design having a central shaft and attached end plates allows greater spacing between upper and lower end plates, resulting in the ability to use larger cup sections.

The central rotor shaft can be a hollow axle that rotates on a stationary support shaft. The hollow axle allows for the support or mounting of the rotor to form one end of the central rotor shaft.

A rotational energy connecting element and a rotational speed sensor are attached to the cup shafts where they together control the rotation of the cup shafts.

A rotor clutch element attached to the rotor uses the rotational energy of the rotating rotor to close the rotor cups into a closed shape. The rotating rotor can be closed into a totally closed three dimensional shape at will by using the clutch element. The totally closed three dimensional shape facilitates braking or stopping the rotor. With no openings or extended cup sections to catch the wind, the totally closed three dimensional shape rotor can be held from rotating with a minimum amount of effort. This totally closed three dimensional shape protects the rotor from extreme conditions, and also prevents entry of animals and unwanted ice and snow into the cups when the rotor is not rotating.

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A braking device attached to the central shaft is used to slow the speed of the rotor as well as lock the rotor from rotating when not in use.

A housing having intake and output openings can enclose the self regulating rotor. The housing is totally closed around its circumference except for openings to allow for fluid to enter and leave the housing such that the rotor in an open S-shape can be used as a pump or a motor. When the rotor is in a totally closed three dimensional shape inside the housing, fluids are free to pass the rotor with little resistance.

Response to Rejection Over Riezinstein in view of Soules

Claims 1-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Riezinstein, U.S. patent 4,718,822 in view of Soules, U.S. patent 4,004,861.

Riezinstein teaches the construction of a self-governing, vertically oriented wind driven assembly, having a pair of open, semi-cylindrically shaped wind scoops with elongated edges 48. The scoops face each other in a nearly closed position at times of high or maximum wind speeds Fig 3, and are partially exposed into the wind at lower wind speeds Fig 4. The scoops are pivotally attached to posts 14 oppositely located at the edges of the rotating frame. The ends of the scoops are modified to permit the scoops to cooperatively slide from an open to a nearly closed position. The amount of exposure of scoops into the wind is dynamically balanced by springs, linkage, and weights. See Fig 3.

The rotor of Riezinstein does not permit the scoops to rotate into a totally closed three dimensional shape, Fig 3, Abstract line 4 "nearly closed position", Claim 1 line 27 & 28 "generally closed" scoop ends. The reference as disclosed will not function if the two scoops are totally closed. Totally closed scoops will not "cooperatively slide" past each other.

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By stark contrast, the present claims require the construction of a rotor with two cups that are able to rotate into a totally closed three dimensional shape. This construction can be seen from Fig 5, Fig 6E, Fig 12B, and Fig 14. The cups rotate from the totally closed three dimensional shape into an open S-shape without the need of a space between the closed cups or any modification to the cups {outline??}.

Riezinstein also teaches the construction of an S-shaped rotor that, when in a fully open orientation, is limited to a cup overlap of 50%, Fig 4. Riezinstein does not disclose any method to fabricate a rotor with overlaps of less than 50%.

By contrast, the presently claimed rotor, when fully open, allows cup overlaps less than 50%. See Fig 3, Fig 6A, Fig 11B, and Fig 13. Cup overlaps of less than 50% have been shown to be the most efficient and affective overlaps for S-shaped rotors.

The Riezinstein rotor has two scoops, each pivotally attached to two posts 12 that are oppositely located at the edges of a rotating frame . The two posts (12 Fig 2) support and separate the top plate 8 from the bottom plate 10. Riezinstein does not suggest a rotor with cup shaft attached at any location other than being pivotally attached to the two supporting posts.

By contrast, the presently claimed rotor has a cup shaft attached to each cup. The cups can pivot or rotate from a closed shape to an open S-shaped rotor.

The cup shafts of the claimed rotor do not function as part of a main supporting structure. The cup shafts do not hold or support an upper disk or plate to a lower disk or plate. Thus, the cups of the claimed rotors not only have overlaps of less than 50% when fully open, they also rotate into a totally closed three dimensional shape.

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Riezinstein teaches the construction of a vertical axis rotor that has an upper plate 8 and a lower plate 10 that forms a rotating frame 6. Two posts 12, located at the edge of the rotating frame, separate and support the upper plate to the lower plate. The rotating frame's lower plate is attached to a power output or shaft 16. The lower plate 8 supports the total rotating frame, or rotor.

Riezenstein does not suggest a vertical axis rotor that has a central shaft to support the rotating frame or rotor. The rotors of Riezenstein are designed for lightness, since they are intended to be placed at the top of a sail boat mast. See column 4, line 9. A central shaft would only add unwanted weight to the rotor. Accordingly, there is no motivation for a central shaft in the Riezenstein rotors.

In sharp distinction to those of Riezenstein, the vertical axis rotor presently claimed have end plates 22, 24 through which cup shafts 32, 42 are pivotally supported, and a central shaft 20 to which end plates are attached. The bottom end plate does not support the total rotor structure. The total rotor's structure is carried on a central shaft to which all end plates are connected. The use of a central shaft and attached end plates allows for rotor designs and construction not possible with rotors that use their lower plates to totally support the rotors structure.

Riezinstein teaches the construction of a vertical axis rotor that uses a centrifugal governor, consisting of centrifugal governor weights 68, springs 66 and linkage 56, 62 to control the speed of rotor rotation. The centrifugal governor controls the rotor's speed of rotation by moving the scoops toward a closed orientation at higher speeds Fig 3, and allowing the cups to open to a 50% overlap at lower rotational speeds Fig 4.

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Riezinstein does not teach the construction of a centrifugal governor device that will allow the rotor's scoops to close into a totally closed three dimensional shape. Riezinstein's design as disclosed, is not able have scoop overlaps of less than 50%. Riezinstein does not teach how rotor scoops can be closed, independent of the wind speed, or rotational speed of the rotor.

In sharp distinction to those of Riezenstein, the vertical axis rotor presently claimed, has a rotational energy connecting element 71 and a rotational speed sensor 73 attached to the cup shafts that together control the rotation of the cup shafts 32, 42 and attached cups 30, 40, such that the cups may form a totally closed three dimensional shape, and when totally open have overlaps of less than 50%.

The claimed rotor also has a clutch element 77 attached to the rotor. The clutch element uses the rotational energy of the rotating rotor to close the rotor cups into a totally closed three dimensional shape Fig 5. A rotating rotor as claimed can use the clutch element to close the rotor into a totally closed three dimensional shape at will, independent of wind speed or the rotor's speed of rotation. With no openings or extended cup sections to catch the wind, the totally closed three dimensional shape protects the rotor from extreme conditions. The totally closed three dimensional shape also prevents the entry of animals and unwanted ice and snow into the cups when the rotor is not rotating.

The examiner cites Soules for its disclosure of having a hollow central shaft 12 that connects end plates 10, 11. Soules teaches the construction of a hollow central shaft 12 which functions as a conduit for air to pass from an air scoop 34, mounted on top of the shaft, to an inflatable sheath 33 that surrounds the hollow central shaft. The function of the hollow shaft as taught by Soules, is to carry pressurized air from the scoop down into the expandable sheath, as a means of limiting the movement of his scoops. See column 2 lines 58 through 65. Soules teaching will not result in the

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construction of a hollow vertical shaft that can be used to support a wind rotor on a stationary supporting shaft. Soules bottom end of the shaft 12 is journaled in bearings housed within fixed base 25, Fig 4, also see column 2 lines 5 and 6. If Soules hollow central shaft where modified to be supported by a fixed supporting shaft, positioned inside the hollow shaft, the modification would eliminate the purpose of Soules hollow shaft to carry pressurized air.

By contrast the present claimed rotor can use a hollow central axle shaft that can rotate on a stationary supporter shaft, page 21 paragraph 1. This allows for the support or mounting of the rotor from one end of the central axle. The rotor as described can be carried by any rigid central support such as a communication tower, lamppost, flagpole, or rigid central supporter shafts on the top of bridges and buildings.

The examiner cites Soules for its disclosure of having a wind mover located in a housing consisting of a base plate 25, and an upper plate 26 that encloses the rotor. Soules teaches the construction of a supporting structure for his rotor that has upper and a lower plates 25, 26 that are securely held in place by six vertical pins 27 that are equally spaced about the plate's outside edges. See Column 2 lines 5 through 9. The rotor rotates between these two plates, with the air free to enter and exit at any location around the structure Fig 1, Fig 4.

Soules does not teach the construction of a housing that would act to control fluid flow in and out of the housing. Soules does not teach the construction of a housing that is totally closed, except for limited openings for intake and output. Soules housing will not allow an enclosed rotor to function as a pump.

The claimed invention teaches the placement of the rotor in a housing with intake and output openings that can enclose the self regulating rotor, Fig 13, Fig 14.

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The housing is totally closed except for openings to control fluid flow in and out of the housing. When the rotor is in a open S-shape orientation inside the housing Fig 13, the rotor can function as a pump or a motor. When the rotor is in a totally closed three dimensional shape inside the housing Fig 14, fluids are free to pass the rotor with little resistance.

The examiner cites that Riezinstein does not disclose a central shaft connecting end plates on the central axis (claim 1), and does not disclose a housing enclosing the rotor, with the housing having intake and output openings (claim 3), with the central shaft being hollow (claim 5).

There is no motivation for joining Soules hollow central shaft with Riezinstein wind driven assembly. The function of the hollow shaft as taught by Soules, is to carry pressurized air from the scoop down into the expandable sheath, as a means of limiting the movement of his scoops. Riezinstein wind driven assembly as disclosed, by not having a central shaft supporting the upper and lower end plates, allows for a rotor that has no central obstruction to cause wind disturbance inside the rotor. Again there is no motivation to add a central shaft to Riezinstein's rotor.

Even if Soules hollow central shaft where incorporated into Riezinstein's device, the resulting rotor still would not function as the claimed invention, having overlaps of less than 50% and being able to close into a totally closed three dimensional shape.

As noted previously Soules teaches the construction of a supporting structure for his rotor that has upper and a lower plates 25, 26 that are securely held in place by six vertical pins 27 that are equally spaced about the plate's outside edges. See Column 2 lines 5 through 9. The rotor rotates between these two plates, with the air free to enter and exit at any location around the structure Fig 1, Fig 4.

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Soules teaches the construction of a supporting structure for his rotor that has upper and a lower plates 25, 26 that are securely held in place by six vertical pins 27 that are equally spaced about the plate's outside edges. See Column 2 lines 5 through 9. The rotor rotates between these two plates, with the air free to enter and exit at any location around the structure Fig 1, Fig 4.

The claimed invention teaches the placement of the rotor in a housing with intake and output openings that can enclose the self regulating rotor, Fig 13, Fig 14. The housing is totally closed except for openings to control fluid flow in and out of the housing. When the rotor is in a open S-shape orientation inside the housing Fig 13, the rotor can function as a pump or a motor. When the rotor is in a totally closed three dimensional shape inside the housing Fig 14, fluids are free to pass the rotor with little resistance.

Thus, there is no motivation for combining the disclosures of the Soules and Riezinstein references because the combination would produce no positive result.

Rejection over Riezenstein in view of Cleveland

Riezinstein's disclosure does not include a brake that can be used to slow or lock the rotor from rotating. Cleveland shows a fluid turbine rotor 10 having a braking device 31 attached to a rotor shaft 15, for the purpose of slowing rotation of the rotor.

Cleveland's braking device is a relatively heavy element compared to the total weight of Riezinstein's rotor. As mentioned above, Riezinstein teaches the construction of a rotor that is suggested for use on sailboats and specifically designed to be located at the top of sailboat masts. Therefore, Riezenstein teaches the importance of light weight rotors. There is no motivation for combining the disclosures of the Cleveland and Riezinstein references

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The joining of Cleveland's brake to Riezinstein's rotor will not produce a rotor that will function as the claimed invention. The claimed invention can close a rotating rotor into a totally closed three dimensional shape at will by using the clutch element. The totally closed three dimensional shape facilitates braking or stopping the rotor.

Finally, Riezinstein's rotor does not show a clutch system attached to the rotor, with the clutch system comprising pulleys connected to the cup shafts, with the clutch system using the rotational energy of the rotating rotor to close the rotor cups into the closed shape.

The examiner claims that claim 1 would be allowable if it is amended to recite that the rotational energy connecting element is a timing belt connected to the cup shafts. The applicant thanks the examiner for this suggestion.

Applicant respectfully believes all the pending claims, as amended, are allowable for the reasons given above. If the examiner has any questions, he is cordially invited to contact the applicant at the telephone number given below.

Respectfully submitted



Arthur Kaliski

Inventor

(631) 267-2092